

Fingerling Production: Nursing Spawn and Fry in Pens

In watersheds, medium irrigation projects (MIPs) can be useful for aquaculture even though these water bodies are many times larger than ponds, and are basically built for irrigation or water storage. However, the full potential of these water bodies is not yet realized.



Why is that?

Well, they are often in remote areas and difficult to reach, because of the poor condition of roads especially during the monsoons, so it is difficult to deliver fingerlings.



During transport, large-sized fingerlings (more than 100 mm long) can die. They are also expensive and only available late in the season. Therefore, these large water bodies are stocked with early fingerlings (50-60 mm) and often inadequately, which ends up with low survival and poor production.

One similarity between ponds and MIPs is that they both have to be stocked annually with fish seed.

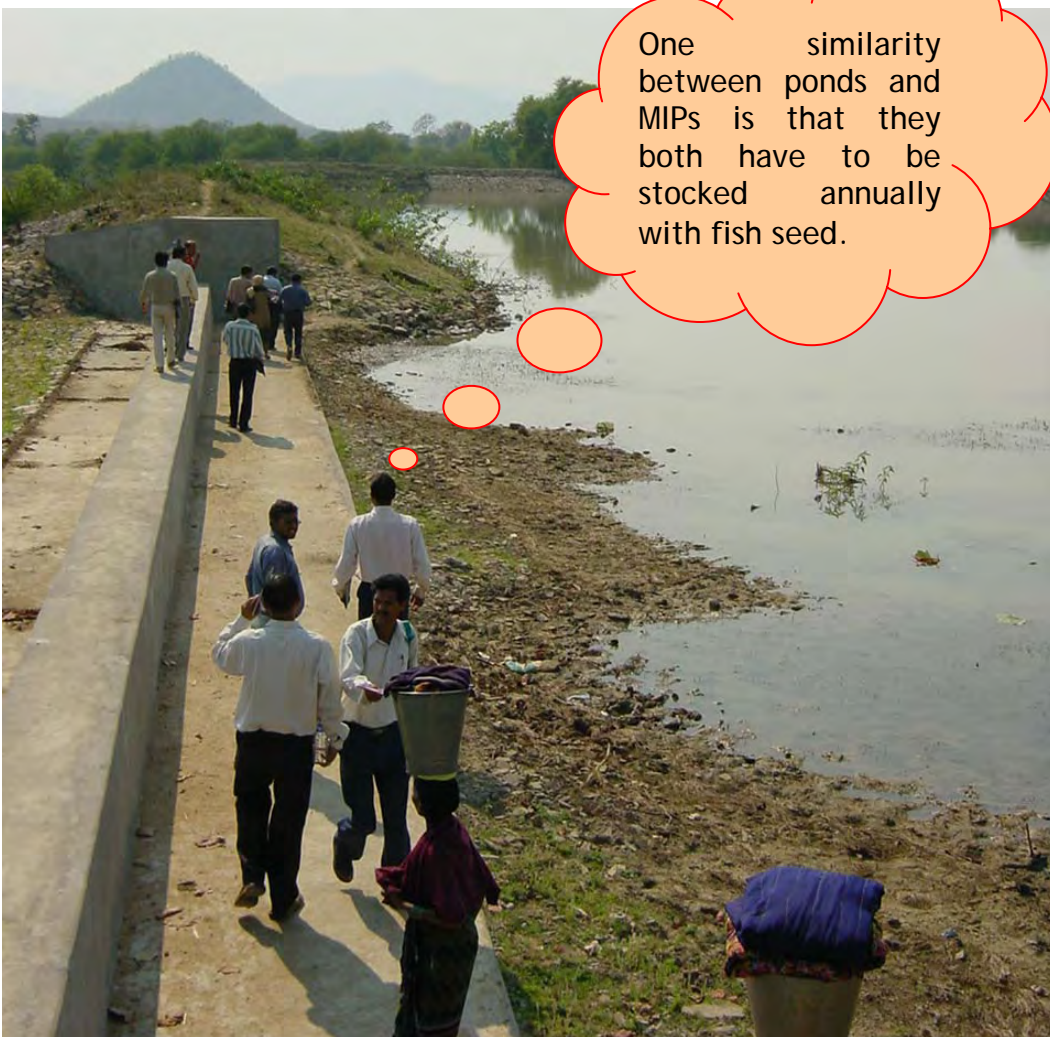
If the production of fingerlings is taken up locally, the twin problems of transportation costs and mortality can both be solved.

If much larger fingerlings can be produced and the MIP can be stocked early in the season, then fish-eating fish in the MIP will cause fewer problems.


Nurseries have been built next to many of the MIPs where spawn is reared and fingerlings produced for stocking the reservoir. This still involves transportation in buckets or *hundies* and needs considerable manpower.

To solve this problem we can use either pens or cages in the water, as widely used in almost all Southeast Asian countries. The cages are more expensive to construct

and manage. Pens, however, are less costly to construct and operate.

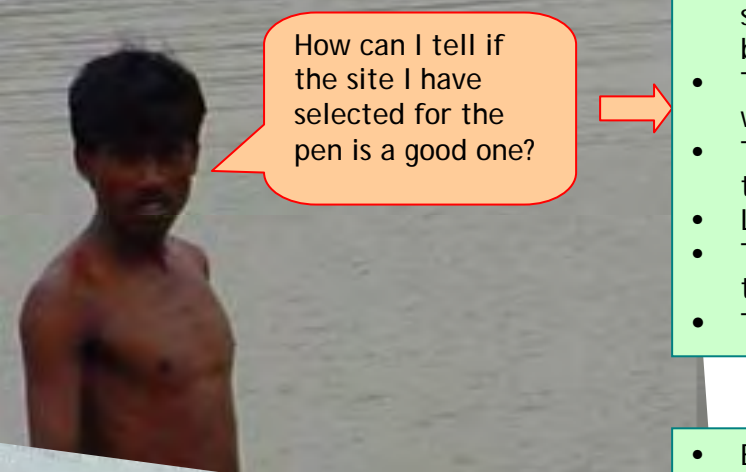


Pens: selection of site and construction



If I want to raise fingerlings in the MIP, should I use a cage or a pen?

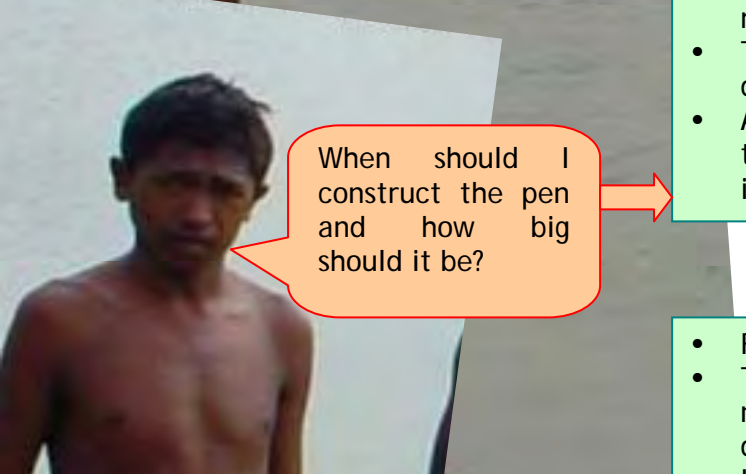
A cage is a big net bag and can either be floating or submerged. Pens are enclosures that are open both at the top and at the bottom. Pens are cheaper to construct and operate than cages and are preferred for fingerling production.



How can I tell if the site I have selected for the pen is a good one?

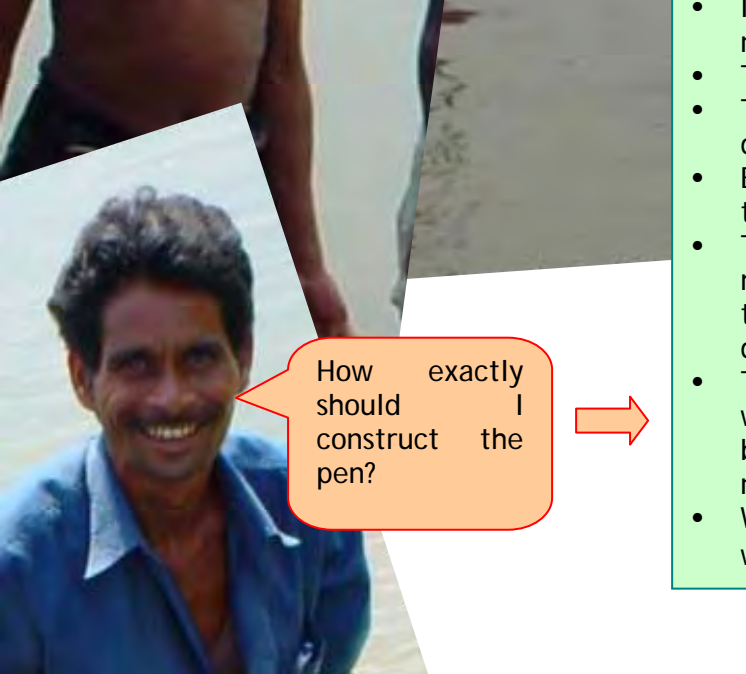
The position of pens has to be as carefully thought about, like when building ponds. The ideal characteristics are:

- The bottom should be clean, smooth, leveled or with a slight gradient, without weeds or rotting vegetation, stones, bricks, rocks or pits.
- The site should not be prone to flooding and the level of water at the site of the pen should not be more than 1.5 m.
- The level of water at the site should not fluctuate during the period when spawn and fry are being reared.
- Lack of rain should not expose the pen site.
- The site should not be exposed to heavy winds and high, turbulent waves.
- The soil and water quality should be good.



When should I construct the pen and how big should it be?

- Build the pen when the bottom is exposed to the sun, maybe during April-May.
- The bigger the pen, the more expensive to build and difficult to manage and operate.
- A good size is 40 m x 25 m (0.1 ha). This could serve the twin purpose of a nursery as a place to produce fry (if there is a market for fry nearby) and then fingerlings.



How exactly should I construct the pen?

- First, mark out and clean the area.
- To save money, a pen at the edge can use three sides of netting, but there is more chance of the water level dropping near the edge.
- If a pen is built away from the edge, all four sides will be netting.
- The boundary of the pen is dug to about 30 cm.
- Then, at suitable intervals (3-5 m), pits (60 cm deep) are dug to fix bamboo or wooden poles.
- Between these poles, split bamboo or mats are fixed and tied with nylon ropes to form a complete enclosure.
- The inner wall of the pen is then covered with a fine-meshed (mesh 0.8 mm) nylon screen so that about 30 cm of the screen is put in the pit. The earth removed during digging is then put over this.
- The screen should be at least 1 m above the maximum water level in the pen to stop fish escaping. A ladder is put both outside and inside the pen and a boat is usually needed.
- When the water level rises, it will enter the pen but no fish will be able to get in.

Preparation and stocking

To be free from disease, bleaching powder (150 kg/ha) may be uniformly sprayed on the bottom of the pen to kill harmful spores and parasites. After 10 days, lime could be added (200 kg/ha) to make the best use of the manure which should be broadcast before the entry of water. Cow dung (5,000 kg/ha) and poultry manure (2,500 kg/ha) are currently the best and cheapest to use.

Make sure the pen is well fertilized.

It is important that your pen is free from disease. You need to prepare it properly.

I like cow dung and poultry manure best.

Eradicate insects using a soap-oil spray.

Spawn should be stocked as soon as the water is full with plankton and when the water is about 1 m deep. Before stocking it is important to get rid of any insects. For this, a soap-oil mixture (1:3) at 50 kg oil/ha can be sprayed onto the water. The spawn can be stocked after 24 hours.

What should the stocking density be?

The stocking density (fish/area of pen) depends on how much water exchanges between the pen and the water outside, and its quality inside the pen. It can be good to arrange the pen in line with the direction of the wind. This is so the current will help water to exchange between the water body and the pen. If fry is to be produced, a stocking density of 5 million/ha (or 5,00,000 in a 40 m x 25 m pen) can be used. If fingerlings are targeted, the density should be 1.5-2 million/ha (or 1.5 - 2,00,000).

To release the spawn into the pen, first float the plastic bags in which the spawn is packed over the surface of the water. This acclimatizes the spawn to the water temperature in the pen. After opening the tops of the bags, slowly allow them to take in small quantities of pond water. The fry should then be allowed to move out into the pen by itself.

If there is only one pen, the spawn of three species - catla, rohu, and mrigal - can be stocked together in the proportion of 40:30:30 or 35:30:35. If there are three or more pens, the spawn of different species can be reared separately.



A fish farmer in Cambodia floats bags in a hapa to acclimatize the spawn before releasing it.

Post-stocking management



Women feed their fish in Vietnam.

The fish should be fed daily from the first day, feeding four times the weight of spawn for the first five days. Then for the next five days, it should be fed at eight times the weight of the spawn. Feeding should be done in two installments: once in the morning and again in the evening. The weight of 100,000 (1 lakh) spawn is approximately 150 g. After 10 days, when the spawn have developed into fry, the feeding rate should be changed. The fry should be fed at 10% of the body weight during the first month which can be reduced to 5% during the next month. The weight of 1,000 fry is 200 g on average.

Production of natural fish food organisms should be kept in mind and manuring should be done periodically. A spray of diluted and thoroughly mixed cow dung (500 kg/ha) and poultry manure (250 kg/ha) could be done every tenth day.

A survival of over 75% at the fry stage and an overall survival of 50% at fingerling stage are expected.

Harvesting and stocking

The fingerlings can be harvested and counted during the second half of September.

After harvesting, the fingerlings can be stocked outside the pen but they should not all be put out at the same time but in stages so that you do not lose them all to predators.

If the water level is not receding, even larger fingerlings, i.e., juveniles, can be produced by extending the rearing period.

Useful Contacts

Other Better-Practice Guidelines

There are many more Better-Practice Guidelines in this series.

You can get more copies of this and other Better-Practice Guidelines from your local One-stop Aqua Shop, STREAM India Communications Hub, from the STREAM Regional Office or from the STREAM Website.

www.streaminitiative.org

We would like your feedback about these Better-Practice Guidelines. You can let us know by phoning, emailing or writing to the Communications Hub Manager at your STREAM Country Office.

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